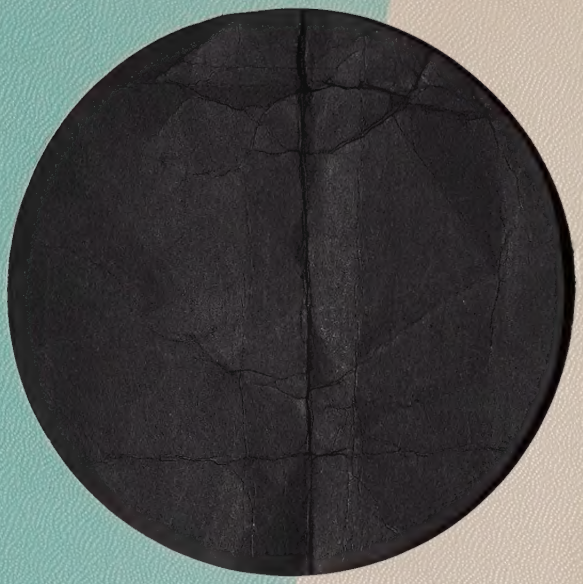
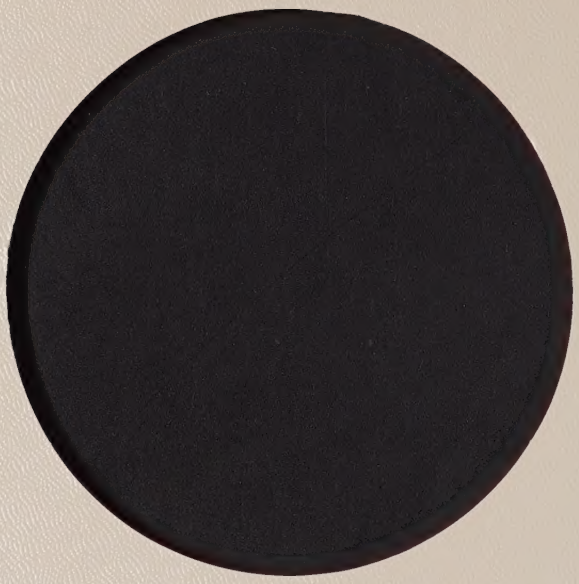


BOEING

BIRD

INSTRUCTION BOOK



BOEING

Model 884 TERMALINE

Coaxial Load Resistor

-

INSTALLATION - OPERATION
MAINTENANCE

Serial No. 87

Instructions
for
INSTALLATION-OPERATION-MAINTENANCE
Model 884 TERMALINE
Coaxial Load Resistor

GENERAL

This Load Resistor is a general purpose coaxial line termination for use with 50/51.5 ohm radio frequency transmission lines. It has a continuous load capacity of 1000 watts in normal ambient temperatures (up to 45°C) and a frequency range from 0 to about 2500 megacycles per second. Under these conditions the Model 884 therefore provides a very low reflection (non-radiating) line termination. This is useful as a substitute antenna to assist in tuning RF transmitter within its range, and for other routine maintenance of special checks on coaxial transmission equipment. The Model 884 is equipped with Bird Coplanar (Type CS) input connector. See paragraph on Fittings below for methods of connecting to it.

ELECTRICAL CHARACTERISTICS

The Model 884 is designed to match the most common high frequency transmission media; i.e., 50 or 51.5 ohm coaxial lines. The impedance, in the VSWR (voltage standing wave ratio) language of such transmission, is quite independent of frequency and almost purely resistive. VSWR values are maintained below 1.1 up to 1000 mc and the calibration results of this particular resistor are tabulated below. In the frequency region 1000 to 2500 mc, calibration is not normally performed. However, tests on typical units of this equipment show VSWR's to be less than 1.25 in this range. Below 50 mc, the input impedance of the dummy load is very nearly a pure resistance to equal to the DC resistance. The production tolerance of the DC resistance on these equipments is held within close limits, and the value for this particular resistor is inscribed in the table included below.

Power measurements may be made on the dummy load by insertion of a Bird Model 43 THRULINE Wattmeter on the coaxial input circuit. Using the appropriate measuring Elements, readings can be obtained within the operating range of the Model 884 (up to 1000 mc).

RESISTANCE and VSWR on Model 884, Serial No. 87

DC Resistance 51.3 ohms.

Frequency	100 Mc.	300 Mc.	500 Mc.	700 Mc.	1000 mc.
VSWR	1.10	1.059	1.09	1.10	1.085

VSWR is below 1.25 at frequencies up to 2500 mc.
All VSWR measurements with 50 ohm slotted line.

Max. continuous load power - 1000 watts in still air.
Max. load for 1/2 hour only - 1200 watts.

884:162

DESCRIPTION

The Model 884 equipment consists essentially of a carbon film-on-ceramic resistor immersed in dielectric coolant. The resistor, particularly selected for its uniform accuracy, is enclosed in a specially tapered housing. This provides a reduction in surge impedance directly proportional to the distance along the resistor. When surrounded by the dielectric coolant, the characteristic impedance is therefore 50 ohms at the front, and zero ohms at the rear - where the housing joins the resistor.

The dielectric oil is chosen for chemical inactivity (to prevent damage to the resistor), high flash point, and its dielectric constant (to which the diameters of the resistor housing are matched). The input connector is constructed with a compressed teflon insulator surrounding the center contact. This connector body and the resistor housing are both pressed on synthetic rubber O-ring seals, preventing coolant leakage at the front end of the unit. The resistor housing is kept in place by the resultant action of drawing up the radial V-clamp band on the respective tapered flanges of the resistor housing and mounting face.

When input power is applied, the resistor generates heat in the adjacent coolant oil. By convection, the heated oil flows thru slotted openings in the coaxial shell to the walls of the fabricated metal tank. The series of radiating fins brazed to the tank transmit the heat of the dielectric oil into the surrounding air.

INSTALLATION

The TERMALINE Resistor is intended for operation in a horizontal position only. It may be placed loose on an appropriate surface, or permanently fastened in a level position by means of its base mounting flanges. The flanges have four 3/8-dia. holes on a 21-1/4 by 5-3/8 base rectangle, for use with screws up to 5/16-inch size. Position the unit for ample air circulation, with at least 6 inches of free air space all around the unit and unobstructed ventilation above it.

SPECIAL CAUTION

Do not apply any electrical power (rf load) to the Model 884 Load Resistor until the Vent Plug is removed. It is very essential to do this to allow for expansion of the heated dielectric oil. The Vent Plug is screwed directly inside the adapter at the top and front of the radiator tank. It is painted red on top face and has a 3/4-in. hex flange. Unscrew this with a 3/4-in. end wrench, or adjustable flat wrench. If the equipment should be moved, replace the plug to prevent oil spillage during transit.

It is possible to manage power loads greater than 1 KW by use of auxiliary ventilation of the equipment. If an effective fan or blower is placed transverse to the radiator, it may be permissable to increase the load power to 1.5 KW or 2 KW under the proper conditions.

CONNECTOR ADAPTER - CA-8B

The coaxial input receptacle on the load resistor is a large diameter teflon dielectric female connector. This has 1-1/8 x 18 screw thread body and is known as a Coplanar Type (CS). It mates directly with the fittings described in the paragraph below. To attach the CA-8B Adapter to Dummy Load, slide back the knurled captive nut, then carefully introduce the center pin into the mating contact on the load receptacle. Push the adapter in squarely, until it bottoms, then bring up the locking nut and turn it clockwise to fasten firmly. For best results, the dielectric faces of the connector and adapter should make intimate contact.

FITTINGS

The Model 884 Load Resistor is supplied with Adapter Type CA-8B which enables the units to be used with RG-8/U cable and UG-21B/U or UG-21D/U male connector; other fittings could be used directly as follows:

CP-17 - 5 ft. of RG-17/U cable with coplanar connector on one end and other end plain.

CP-19 - 5 ft. of RG-19/U cable with coplanar connector on one end and other end plain.

(May be obtained from the manufacturer on application).

MAINTENANCE

This equipment is rugged and simple, and should require only nominal routine care. Keep the radiator dusted off and the electrical parts free of dirt and grime. If the connector (or the CA-8B Adapter) contacts or faces should become dirty, wipe off with a little dry solvent on a cotton swab stick.* If carbon tetrachloride is used, exercise caution to avoid fumes.

If the Resistor Housing Assy #811202 should need replacement, proceed as follows: To avoid the possibility of coolant spillage, replace Shipping Plug #245049 before proceeding. Place the radiator #245003 on its back end (connector up). Then loosen and remove the screw on the clamping band #24355 at the base of the front cone. Remove clamping band and carefully lift out the Resistor Housing unit in a vertical direction, allowing the oil to drip back into the tank (be sure the radiator unit is properly held). The O-ring #81139 is fitted on the telescoping ring #24316 which will probably remain nested in the cylindrical facing of the radiator tank. Do not re-use the O-ring unless it is in very good condition.

Before replacing the resistor housing, check that the telescoping ring arrangement is properly set - i.e., with the thin section of the step shoulder fitted inside the radiator nosepiece, and the O-ring #81139 outside on the thick section, pushed snugly against the adjacent face. Before reassembling the equipment, check the coolant level - it should be four inches below the bare edge of the cylindrical flange when the radiator is on end. Replace the Resistor Housing Assy by reversing the procedure described above, and tighten the #10-32 clamping screw securely - making sure that the clamping band is on evenly. Then restore the Load Resistor to a horizontal position, and inspect carefully for oil leakage. Before using equipment, be certain to reopen the Vent Plug, and if deemed necessary recheck the coolant level - see Coolant Section, next page.

*Use Inhibisol or trichlorethylene if available. Inhibisol is a non-toxic, non-flammable dry cleaning agent available from Penetone Co., Tenafly, New Jersey.

COOLANT

The Dummy Load is factory filled to the proper coolant level (with G.E. 10C Transformer Oil) at room temperature. Expansion of the coolant with rise in temperature is taken care of by means of the vent plug previously discussed. The oil level should be about 2-1/4 to 2-1/2 inches below the top face of the filler hole. Reasonable amounts of oil loss will not seriously reduce the capacity of the equipment.

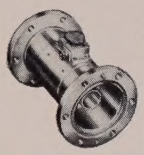
List of Replaceable Parts

Qty.	Part No.	Name	
1	245003	Radiator	
1	245049	Plug, Shipping	
1	5131	O-Ring, Plug	
1	24316	Ring, Telescoping	
1	24355	Clamping Band Assy	
1	81139	O-Ring	Linear #11-242
1	811202	Resistor Housing Assy	
-	5030	1.7 Gal. Type B Coolant	GE Trans. Oil
1	811186	CA-8B Adapter ("CS" to Female N)	
(1)	24381	Vent Valve - alternative type pressure release plug which may be used in place of Shipping Plug #245049. It is not removed during operation of the load resistor. Obtainable from the company on special order.	

Bird Electronic Corporation
Cleveland 39, Ohio

THRULINE

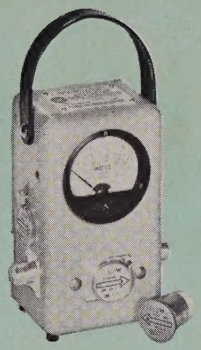
DIRECTIONAL RF WATTMETERS



Model 43 and Rigid Line Series

Direct reading . . . "thru" type measure forward or reflected power in complete systems under operating conditions . . . inserted between transmitter and antenna or load . . . full scale power and frequency range determined by plug-in elements.

50-Ohm nominal



Model	Connectors	ELEMENTS	
		Frequency (mc)	Power Ranges
43	QC Type★	2-30	50, 100, 250, 500, 1000 watts
		25-60; 50-125; 100-250; 200-250; 400-1000	5, 10, 25, 50 100, 250, 500 1000 watts
4712 4715°	1⅝" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	.25, .5, 1, 2.5, 5KW
460 4610°	3⅛" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	1, 2.5, 5, 10, 25KW
4902	6⅛" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	2.5, 5, 10, 25, 50KW
4910	9" Flanged	Per Customer Specifications	

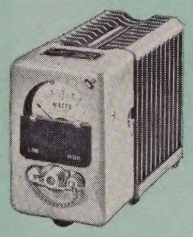
°Double Socket Thruline for monitoring of forward and reflected power.

to measure rf power... THRULINE

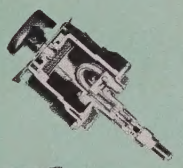
TERMALINE ...to absorb rf power

Model	Freq. Range	Max. Power	Power Range Scales	Input Connector
6254	30-500 mc	1 w	25, 50, 100, 250, 500 and 1000 milliwatts	Female "BNC"
61	30-500 mc	80 w	Choice of two compatible scales. Lowest .5 watt	Female "N"
611	30-500 mc	60 w	Dual Range 0-15/60 w	Female "N"
612	30-500 mc	80 w	Dual Range 0-20/80 w	Female "N"
67	30-500 mc	500 w	0-25/100/500 watt	Female "N"
694	2- 30 mc	1000 w	0/1000 watt	QC Type★
6835	30-500 mc	1200 w	0-120/600/ 1200 watt	QC Type★
67C°	30-500 mc	2500 w	0-100/500/ 2500 watt	Female "N"

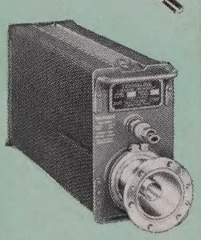
°Water Cooled on High Range



Model	74	718	72R	72-2
Positions	Six	Eight	Reversing Switch	Two
Coaxial Circuits	One	One	Two	Two
Connector	Type N female connectors are standard on all models to receive UG-21/U series plug. Use adapters with other cables and connectors.			



Model	Max. Power	Frequency Range	*Max. VSWR	Input Connector
80 Series	5 w	0-4 KMC	1.25	Male or Female, N; C; BNC
80 A	20 w	0-2 KMC	1.2	Female "N"
8130	50 w	0-4 KMC	1.2	QC Type★
81B	80 w	0-4 KMC	1.2	Female "N"
8135	150 w	0-4 KMC	1.2	QC Type★
82A	500 w	0-3.3 KMC	1.2	Female "N"
8201	500 w	0-2.5 KMC	1.25	QC Type★
8833	1000 w	0-2.5 KMC	1.25	QC Type★
8813	1000 w	0-2.0 KMC	1.25	1⅝ EIA Flanged
888	1200 w	0-2.0 KMC	1.25	3⅛ EIA Flanged
8890	2500 w	0-2.5 KMC	1.25	QC Type★
82C°°	2500 w	0-3.3 KMC	1.2	Female "N"
8950°°°	5000 w	0-2.5 KMC	1.25	QC Type★

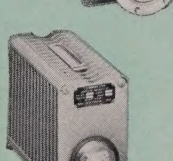


Other water-cooled loads up to 50KW can be supplied.

*VSWR is 1.1 or less to 1000 mc on all models — with "N" connectors.

°°Water Cooled °°°Forced Air

★QC TYPE: Bird Quick-Change Connector, designed for rapid change. Available in following types: Female or Male N, C, HN, BNC, LC, LT, UHF, and ⅞" EIA flanged.



TERMALINE

RF ABSORPTION WATTMETERS

Portable — Non Radiating

Portable . . . direct reading . . . non-radiating "load" type wattmeter . . . used in field or laboratory to measure and absorb power . . . accuracy ±5% of full scale . . VSWR 1.1 to 1 maximum over operating range.

COAXWITCH

COAXIAL SELECTOR SWITCHES

Dependable, manually-operated switches for selecting antennas, receivers, transmitters or other apparatus with coaxial connections. Ideal as a system component in electronic equipment where reliable, repeated channel switching is required; pull knob, rotate, and push in to make contact.

TERMALINE

RF LOAD RESISTOR

Quick-Change Connectors

Reflection-free terminations for 50-ohm coaxial lines . . . low VSWR . . . non-radiating . . . water cooled rating 2500 W to 50 KW . . . air cooled rating to 2.5 KW . . . forced air to 5 KW. Quick-Change Connectors (★QC Type) available on many models.

COAXIAL RF FILTERS

Our extensive engineering and manufacturing facilities are at your command for the custom design and manufacture of filters to your specifications. Intelligent design, skillfull manufacture assure you of highest performance and reliability. New miniature filters, as light as five ozs., are available and can be produced in quantity.

Complete Specifications on request.

© BIRD

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